Elasticity

In economics, it’s generally helpful to have some measure of how responsive consumers and producers are to changes in price. In some cases, consumers will just grin and bear a price increase, while in other situations they will avoid the more expensive product like the plague. Similarly, sometimes suppliers will greatly increase production when they see higher prices to be had, and sometimes they are stuck with a certain level of capacity and thus an upper limit on output (at least in the short term). Also, economists find that people often think about these decisions in terms of relative price changes rather than absolute ones. For example, people report that they are much more willing to drive out of their way to save $10 on a $30 calculator than to save $10 on a$2000 computer, even though they are saving the same $10 in either case.

As such, economists use the concept of elasticity, which is defined as a ratio of relative changes. We will look at two types of price elasticity; demand and supply.

**Price Elasticity of Demand** measures the extent to which the quantity of a product demanded responds to a change in price, while

[**Price Elasticity of**](http://en.wikipedia.org/wiki/Price_elasticity_of_supply)[**Supply**](http://en.wikipedia.org/wiki/Price_elasticity_of_supply) measures change in the amount supplied by companies in response to a change in price.

**Calculating and Determining Elasticity**

Economists have special formulas that they use to determine the elasticity of both demand and supply. In each calculation you are trying to determine a number or coefficient that will help us in classifying the type of Elasticity.

**Calculating Elasticity of Demand**

To calculate the elasticity for demand the following formula is used. When we calculate a coefficient we are only concerned with absolute value. Therefore if the final coefficient is negative, we ignore that sign and look at it as positive.

CED = % Change in Quantity Demanded /

% Change in Price

 But before you can use this formula you have to be able to determine the percent change in both the quantity demanded and the change in price. You will be given information every time that you calculate elasticity. Using the information in the chart you will determine the numbers that you will use to find your coefficient. To do this we use the following formulas:

% Change in Quantity Demanded = New Demand – Old Demand   
 Old Demand

% Change in Price = New Price – Old Price  
 Old Price

Once you have these two numbers you can complete CED equation and determine the type of elasticity. Let’s look at an example:

**You are a manufacturer for a CD Company. It has been determined that you are going to change the price for your CD`s along with you packaging options. The following table was presented to you. Find the Demand Coefficient.**

|  |  |  |
| --- | --- | --- |
|  | **Old** | **New** |
| **Price** | 9 | 10 |
| **Demand** | 150 | 110 |

**Step 1: Determine the Change in Quantity Demanded**

% Change in Quantity Demanded = New Demand – Old Demand   
 Old Demand

% Change in Quantity Demanded = 110 – 150  
 150

= -40  
 150

= -0.2667

**Step 2: Determine the Change in Price**

% Change in Price = New Price – Old Price   
 Old Price

% Change in Price= 10 – 9  
 9

= 1  
 9

= 0.1111

**Step 3: Determine the CED**

CED = % Change in Quantity Demanded   
 % Change in Price

CED = -0.2667  
 0.1111

CED = -2.4005

Once you have found the coefficient, you can then classify the elasticity. The higher the price elasticity, the more sensitive consumers are to price changes. Very high price elasticity suggests that when the price of a good goes up, consumers will buy a great deal less of it and when the price of that good goes down, consumers will buy a great deal more. Very low price elasticity implies just the opposite, that changes in price have little influence on demand.

* If Elasticity of Demand is > 1 then Demand is Price Elastic (Demand is sensitive to price changes)
* If Elasticity of Demand is = 1 then Demand is Unit Elastic
* If Elasticity of Demand is < 1 then Demand is Price Inelastic (Demand is not sensitive to price changes)

Recall that we always ignore the negative sign when analyzing price elasticity, so Elasticity of Demand is always positive. In the case of our good, we calculated the price elasticity of demand to be 2.4005, so our good is price elastic and thus demand is very sensitive to price changes

**Factors Affecting Demand Elasticity**

There are three main factors that influence a demand's price elasticity:

1. **The availability of substitutes -**This is probably the most important factor influencing the elasticity of a good or service. In general, the more substitutes, the more elastic the demand will be. For example, if the price of a cup of coffee went up by $0.25, consumers could replace their morning caffeine with a cup of tea. This means that coffee is an elastic good because a raise in price will cause a large decrease in demand as consumers start buying more tea instead of coffee.

However, if the price of caffeine were to go up as a whole, we would probably see little change in the consumption of coffee or tea because there are few substitutes for caffeine. Most people are not willing to give up their morning cup of caffeine no matter what the price. We would say, therefore, that caffeine is an inelastic product because of its lack of substitutes. Thus, while a product within an industry is elastic due to the availability of substitutes, the industry itself tends to be inelastic. Usually, unique goods such as diamonds are inelastic because they have few if any substitutes

1. **Amount of income available to spend on the good -**

This factor affecting demand elasticity refers to the total a person can spend on a particular good or service. Thus, if the price of a can of Coke goes up from $0.50 to $1 and income stays the same, the income that is available to spend on coke, which is $2, is now enough for only two rather than four cans of Coke. In other words, the consumer is forced to reduce his or her demand of Coke. Thus if there is an increase in price and no change in the amount of income available to spend on the good, there will be an elastic reaction in demand; demand will be sensitive to a change in price if there is no change in income.

1. **Time -**

The third influential factor is time. If the price of cigarettes goes up $2 per pack, a smoker with very few available substitutes will most likely continue buying his or her daily cigarettes. This means that tobacco is inelastic because the change in price will not have a significant influence on the quantity demanded. However, if that smoker finds that he or she cannot afford to spend the extra $2 per day and begins to kick the habit over a period of time, the price elasticity of cigarettes for that consumer becomes elastic in the long run.

**Examples of Goods that Have Inelastic Demands**

* [Petrol](http://www.economicshelp.org/blog/7023/environment/fuel-consumption-in-uk/)– petrol has few alternatives because people with a car, need to buy petrol. For many driving is a necessity. There are weak substitutes, such as train, walking and the bus. But, generally, if the price of petrol goes up, demand proves very inelastic.
* Salt- If the price of salt increased, demand would largely be unchanged. It is only a small % of income and people tend to buy infrequently. It is a good with no real substitutes at all.
* Good produced by a monopoly- Any good produced by a monopoly is likely to be inelastic demand. For example, if Sasktel increase the cost of premiership pay per view, many football fans will pay the extra price. Though because it isn’t a necessity, demand may be less inelastic than say petrol.
* Tap water- For householders, tap water is a necessity, with no alternatives. If the water companies increase the cost of water bills, people would keep buying the service. It would have to rise to a very high price before people disconnected their water supply. This is why tap water is regulated.
* Diamonds- Bought very infrequently, diamonds are the ultimate luxury with few exact alternatives. You could buy other precious gems, but others may not have the same allure as diamonds. A cut in price wouldn’t increase demand very much.
* Cigarettes- If cigarette tax increases and the price of all tobacco increases, demand will be inelastic because many smokers are addicted and don’t have any alternatives to keep buying.
* Apple iPhones, iPads- The Apple brand is so strong that many consumers will pay a premium for apple products. If the price rises for apple iPhone, many will continue to buy. If it was a less well-known brand like Dell computers, you would expect demand to be price elastic.

**Examples of Goods that Have Elastic Demands**

* Heinz soup- These days there are many alternatives to Heinz soup. If price rises, people will switch to less expensive varieties.
* Shell petrol- We say that petrol is overall inelastic. But, if an individual petrol station increases price, people will buy from other petrol stations. The only exception is if a petrol station has a local monopoly

– e.g. at service station on the motorway there is a captive audience. But, in a city center with many alternatives, people will have an elastic demand.

* Wonder bread- Wonder bread will be highly price elastic because there are many better alternatives. If the price of Wonder bread rises, consumers will switch to alternatives.
* Leader Post- If the Leader Post increases in price, there are similar newspapers people will switch to. For example, the Daily Mail or the Globe and Mail. If it was a newspaper like the Financial Times of the Economist, demand would be more inelastic, as there is no close substitute to the Financial Times.
* Aero chocolate bar- If Aeros increase, people will switch to alternative types of chocolate bar.
* Porsche sports car- If a Porsche increases, demand will probably be elastic because it is a high % of income, and so the higher price will put people off. Also, there are other alternatives, such as Jaguar or Aston Martin. However, this is a little less clear cut. Some car enthusiasts may want to buy a Porsche whatever the price

**Calculating Elasticity of Supply**

To calculate the elasticity for supply the following formula is used. When we calculate a coefficient we are only concerned with absolute value. Therefore if the final coefficient is negative, we ignore that sign and look at it as positive.

CES = % Change in Quantity Supplied

% Change in Price

But before you can use this formula you have to be able to determine the percent change in both the quantity supplied and the change in price. You will be given information every time that you calculate elasticity. Using the information in the chart you will determine the numbers that you will use to find your coefficient. To do this we use the following formulas:

% Change in Quantity Supplied = New Supply – Old Supply   
 Old Supply

% Change in Price = New Supply – Old Supply  
 Old Supply

Once you have these two numbers you can complete CES equation and determine the type of elasticity. Let’s look at an example:

**You are a manufacturer for a CD Company. It has been determined that you are going to change the price for your CD`s along with you packaging options. The following table was presented to you. Find the Supply Coefficient.**

|  |  |  |
| --- | --- | --- |
|  | **Old** | **New** |
| **Price** | 9 | 10 |
| **Supplied** | 150 | 110 |

**Step 1: Determine the Change in Quantity Supplied**

% Change in Quantity Supplied = New Supply – Old Supply   
 Old Supply

% Change in Quantity Supplied = 110 – 150  
 150

= -40  
 150

= -0.2667

**Step 2: Determine the Change in Price**

% Change in Price = New Price – Old Price   
 Old Price

% Change in Price= 10 – 9  
 9

= 1  
 9

= 0.1111

**Step 3: Determine the CES**

CES = % Change in Quantity Supplied   
 % Change in Price

CES = -0.2667  
 0.1111

CES = -2.4005

Once you have found the coefficient, you can than classify the elasticity. The price elasticity of supply is used to see how sensitive the supply of a good is to a price change. The higher the price elasticity, the more sensitive producers and sellers are to price changes. A very high price elasticity suggests that when the price of a good goes up, sellers will supply a great deal less of the good and when the price of that good goes down, sellers will supply a great deal more. Avery low price elasticity implies just the opposite, that changes in price have little influence on supply.

* If Elasticity of Supply is > 1 then Supply is Price Elastic (Supply is sensitive to price changes)
* If Elasticity of Supply is = 1 then Supply is Unit Elastic
* If Elasticity of Supply is < 1 then Supply is Price Inelastic (Supply is not sensitive to price changes)

Recall that we always ignore the negative sign when analyzing price elasticity, so Elasticity of Supply is always positive. In our case, we calculated the price elasticity of supply to be 2.4005, so our good is price elastic and thus supply is very sensitive to price changes.

**Factors Affecting Supply Elasticity**

 There are a few factors that determine how elastic supply (i.e. how responsive quantity supply is to changes in prices) for a particular good is:

1. **Time:** Supply will be different in the short and long run with time. In the short run, firms will only be able to increase input of labour to increase supply of commodities. Supply change will be little because other factors of production may not be increased in the same proportion as the change in price and may limit the supply. However, in the long run a firm will increase the input of all factors of production and thus the supply becomes more price elastic.
2. **Availability of resources:** If the economy is already using most of its scarce resources, then firms will find it difficult to employ more (i.e. workers) and so output will not be able to rise. The supply of most goods and services will therefore be price inelastic, and vice versa.
3. **Number of producers:** If there are more producers, this means that the output can be increased more easily. Thus supply is more elastic as a result.
4. **Ease of storing stocks:** The type of good that a producer supplies will affect elasticity. If goods can be stocked with ease and have a long shelf life, then supply will be elastic. Otherwise the goods will be inelastic. For example; perishable goods such as fresh flowers, vegetables have comparatively inelastic supply because it is difficult to store them for longer periods.
5. **Increase in cost of production as compared to output:** In cases where there is a significant increase in cost of production when output is increased, supply is inelastic. This is because suppliers would have to make a significant investment in order to increase the output. This would take time and some suppliers may be hesitant in doing so.
6. **Improvements in Technology:** Some industries will have improvements in technology that affects the price elasticity of supply. Improvements lead to goods being more elastic (i.e. firms are more efficient in production- better machinery so output is increased greater with increase in price) as compared to industries where there are less improvements.
7. **Stock availability of finished goods:** In some industries where there are higher inventories or stock of finished goods, the supplier can supply more as the price rises. Thus, the price elasticity of supply for these goods will be elastic.